Pre-AP Geometry 10-3 Study Guide: Composite Figures (pp 694-700)

<u>Attendance Problems</u>. **Find the area of each figure.**

1. A rectangle in which $b = 14$ cm and $h = 5$ cm.

2. A triangle in which $b = 6$ in. and $h = 18$ in.

3. A trapezoid in which $b_1 = 7$ ft, $b_2 = 11$ ft, and $h = 3$ ft

- I can use the area addition postulate to find the areas of composite figures.
- I can use composite figures to estimate the areas of irregular shapes.

Vocabulary: Composite Figure

Common Core

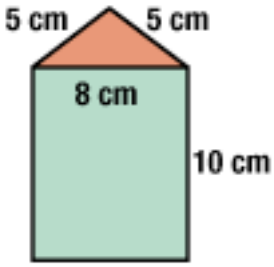
CC.9-12.G.MG.3 Apply geometric methods to solve design problems.

CC.9-12.G.SRT.9 (+) Derive the formula $A = \frac{1}{2}ab\sin C$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

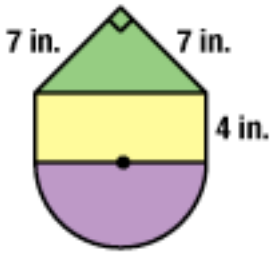
4. What is a composite figure?

<u>Video Example 1</u>: Refer to video example 1. Find the area of the shaded region. If necessary, round your answer to the nearest tenth.

A)



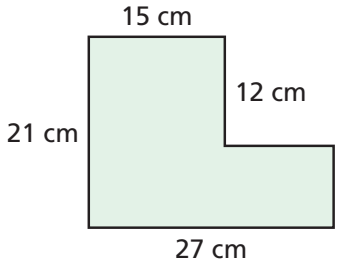
B)



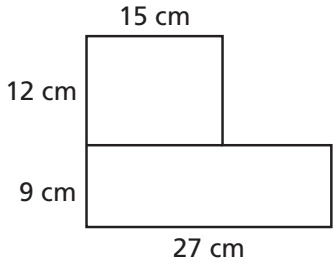
1 Finding the Areas of Composite Figures by Adding

Find the shaded area. Round to the nearest tenth, if necessary.

A



Divide the figure into rectangles.

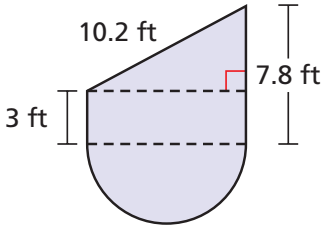


area of top rectangle:
$A = bh = 12(15) = 180 \text{ cm}^2$

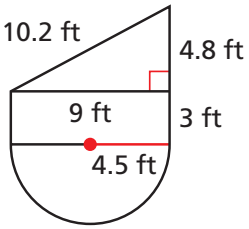
area of bottom rectangle:
$A = bh = 9(27) = 243 \text{ cm}^2$

shaded area:
$180 + 243 = 423 \text{ cm}^2$

B



Divide the figure into parts. The base of the triangle is $\sqrt{10.2^2 - 4.8^2} = 9$ ft.



area of triangle:
$A = \frac{1}{2}bh = \frac{1}{2}(9)(4.8) = 21.6 \text{ ft}^2$

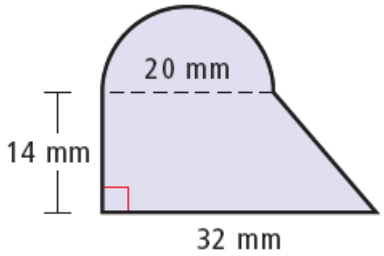
area of rectangle:
$A = bh = 9(3) = 27 \text{ ft}^2$

area of half circle:
$A = \frac{1}{2}\pi r^2 = \frac{1}{2}\pi(4.5^2) = 10.125\pi \text{ ft}^2$

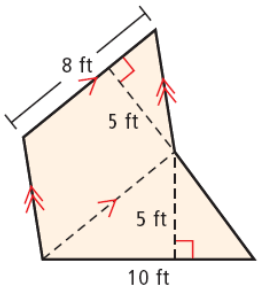
shaded area:
$21.6 + 27 + 10.125\pi \approx 80.4 \text{ ft}^2$

Example 1.

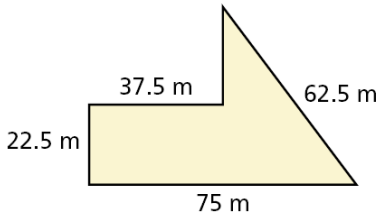
A. Find the shaded area. Round to the nearest tenth, if necessary.



B. Find the shaded area. Round to the nearest tenth, if necessary.

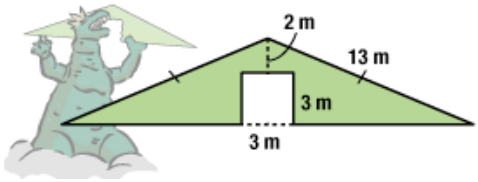


5. <u>Guided Practice</u>: Find the area of the shaded region. If necessary, round your answer to the nearest tenth.

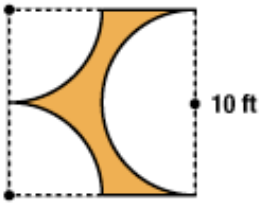


<u>Video Example 2</u>: Refer to video 2. Find the area of the shaded region. If necessary, round your answer to the nearest tenth.

A)



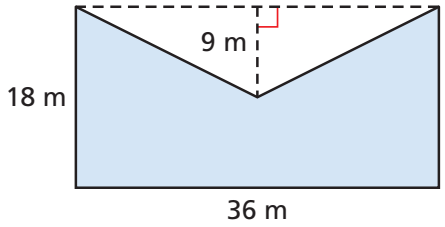
B)



2 Finding the Areas of Composite Figures by Subtracting

Find the shaded area. Round to the nearest tenth, if necessary.

A



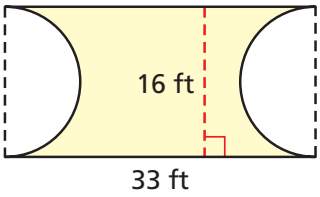
Subtract the area of the triangle from the area of the rectangle.

area of rectangle:
$A = bh = 18(36) = 648 \text{ m}^2$

area of triangle:
$A = \frac{1}{2}bh = \frac{1}{2}(36)(9) = 162 \text{ m}^2$

area of figure:
$A = 648 - 162 = 486 \text{ m}^2$

B



The two half circles have the same area as one circle. Subtract the area of the circle from the area of the rectangle.

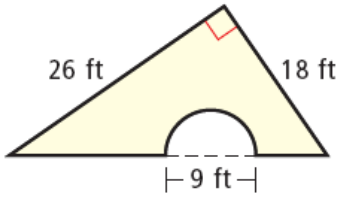
area of the rectangle:
$A = bh = 33(16) = 528 \text{ ft}^2$

area of circle:
$A = \pi r^2 = \pi(8^2) = 64\pi \text{ ft}^2$

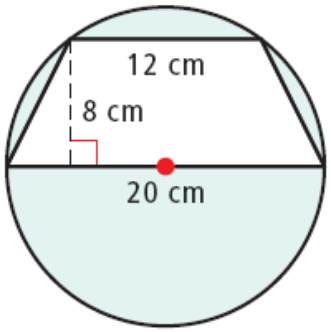
area of figure:
$A = 528 - 64\pi \approx 326.9 \text{ ft}^2$

Example 2.

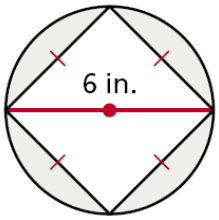
A. Find the shaded area. Round to the nearest tenth, if necessary.



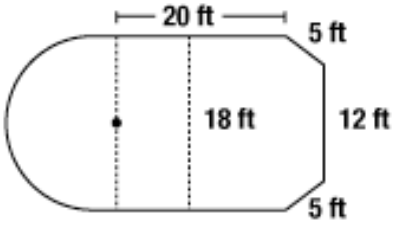
B. Find the shaded area. Round to the nearest tenth, if necessary.



6. <u>Guided Practice:</u> Find the area of the shaded region. If necessary, round your answer to the nearest tenth.

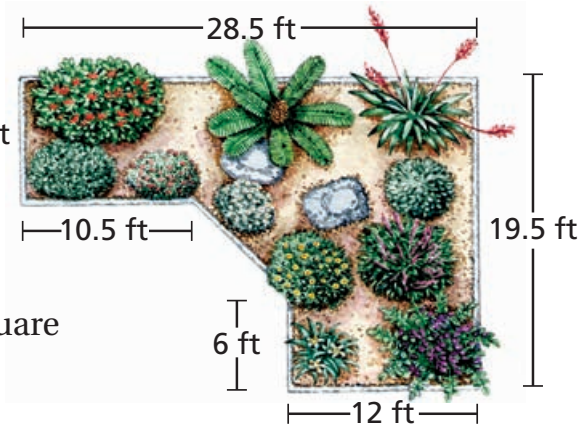


<u>Video Example 3</u>: A small theatre has a floor-plan with the dimensions shown. To effectively air condition a room, 20 BTU's (British Thermal Units) are required for every square foot. Determine the minimum BTU's required for an air conditioner to cool the theatre effectively. Round your answer to the nearest hundred BTU's.



3 Landscaping Application

Katie is using the given plan to convert part of her lawn to a xeriscape garden. A newly planted xeriscape uses 17 gallons of water per square foot per year. How much water will the garden require in one year?

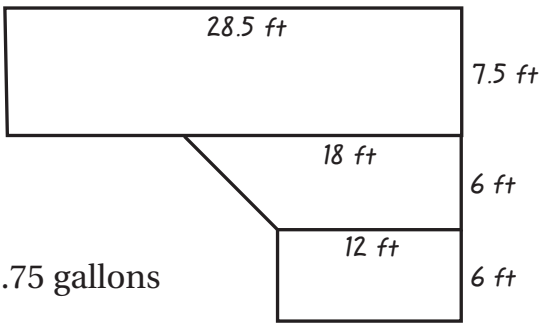


To find the area of the garden in square feet, divide the garden into parts.

The area of the top rectangle is $28.5(7.5) = 213.75 \text{ ft}^2$.

The area of the center trapezoid is $\frac{1}{2}(12 + 18)(6) = 90 \text{ ft}^2$.

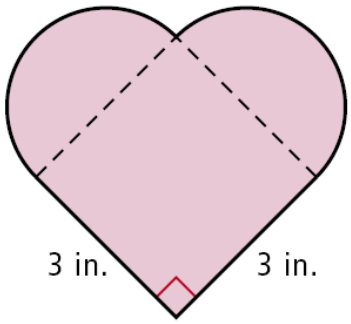
The area of the bottom rectangle is $12(6) = 72 \text{ ft}^2$.



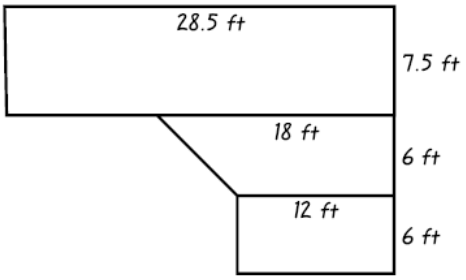
The total area of the garden is $213.75 + 90 + 72 = 375.75 \text{ ft}^2$.

The garden will use $375.75(17) = 6387.75$ gallons of water per year.

Example 3. A company receives an order for 65 pieces of fabric in the given shape. Each piece is to be dyed red. To dye 6 in^2 of fabric, 2 oz of dye is needed. How much dye is needed for the entire order?

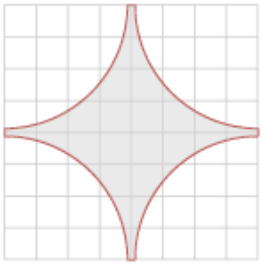


4. <u>Guided Practice</u>: The lawn that Kadence is replacing requires 79 gallons of water per square foot per year. A xeriscape garden requires 17 gallons of water per square foot per year. How much water will Kadence save by planting the xeriscape garden?



<u>10-3 Composite Figures</u> *(p 697)* 9-13.

Video Example 4. Use a composite figure to estimate the shaded area. The grid has squares with side lengths of 1 cm.



10-3 Composite Figures

- *(p 697)* 9-13, 22, 23, 30.
- 10A Ready to Go On pretest & posttests.

Teacher: Did you just throw your art project together last night?
Student: Yes. I call it *Composite Art*.

"The measure of success is not whether you have a tough problem to deal with, but whether it is the same problem you had last year."—*Former Secretary of State, James Foster Dulles*

"The area of the circle is pi *r* squared. The area of the triangle is one-half *bh*."